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ABSTRACT

A study examined rural, low-income students' experiences with online advanced placement (AP) courses. Interviews were conducted with 30 students, their mentors, and school administrators at four rural high schools in two Western states; 25 students were low-income. Positive comments about the online experience mentioned interaction with other students, familiarity with computers and the Internet, ease of navigation, positive experience with vendor, student collaboration, and self-direction. Only a few of the 25 low-income students passed their online AP courses. Critical issues raised included extra time spent in online learning, pace of the course, learning strategies, course selection, lack of preparation, isolation, lack of incentives, problems with group work, access to course texts, mentor issues, instructor issues, attrition, and performance. This report concludes that online AP courses complicate the learning environment for rural and low-income students. For these students to succeed in online AP courses, they must be better prepared for these courses. Online AP courses should be designed to promote active learning, student interaction, and group interaction. Because online AP courses take at least one-third more time than traditional courses, students need access to computers outside of class, ideally at home. The roles of online instructors and mentors need to be better clarified and ways are needed to offer students content help when there are no local teachers with subject-matter expertise. Recommendations for further research are presented. Two appendices present interview questions and a 15-item annotated bibliography. (TD)

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Online Advanced Placement Courses:

Experiences of Rural and Low-Income High School Students

Kathleen W. Marcel
Consultant

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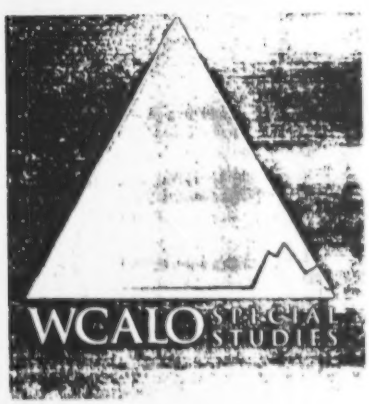

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March 2003

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Western Interstate Commission for Higher Education

The Western Interstate Commission for Higher Education (WICHE) is a public, interstate agency established to promote and facilitate resource sharing, collaboration, and cooperative planning among the Western states and their colleges and universities. Member states are:

Alaska	Idaho	Oregon
Arizona	Montana	South Dakota
California	Nevada	Utah
Colorado	New Mexico	Washington
Hawaii	North Dakota	Wyoming

WICHE's broad objectives are to:

- Strengthen educational opportunities for students through expanded access to programs,
- Assist policymakers in dealing with higher education and human resource issues through research and analysis, and
- Foster cooperative planning, especially that which targets the sharing of resources.

This publication was prepared by the Policy Analysis and Research Unit, which is involved in the research, analysis, and reporting of information on public policy issues of concern in the WICHE states.

This report is available free of charge online at: http://www.wiche.edu/Policy/WCALO/pubs.htm. For additional inquiries, please contact Caroline Hilk at (303) 541-0224 or chilk@wiche.edu.

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Online Advanced Placement Courses: Experiences of Rural and Low-Income High School Students

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Executive Summary

This project was undertaken at the request of the Western Consortium for Accelerated Learning Opportunities (WCALO), a partnership of nine Western states that was launched in 2000 under a grant from the federal Advanced Placement Incentive Program (APIP). The purpose of this special study was to examine rural and low-income students' experiences with online Advanced Placement (AP) courses. This was an exploratory study. The availability of online AP courses is a recent development, and little has been written about it in general; the experience of rural and low-income students has received even less coverage. While online learning is now a common option for college students and other adults, offering these courses to high school students is only now evolving through virtual high schools and proprietary entities.

In April and May 2002, 30 students, their mentors and school administrators were interviewed at four rural high schools in two Western states about their experiences with online AP courses. Twenty-five students met the criteria under the APIP to qualify for AP exam subsidies, meaning they could be classified as low-income. The students who participated in this project enrolled in a variety of online AP courses, beginning in the spring term of 2001 and continuing throughout the 2001-2002 school year. These included general courses in U.S. and world history, English literature and composition, and chemistry as well as more advanced courses in subjects like economics and physics.

Some of the positive comments about the online AP experience from rural and low-income students and their mentors included:

- interaction with other students
- familiarity with computers and the Internet
- ease of navigation
- positive experience with vendor
- student collaboration
- self-direction.

Students and others interviewed also raised numerous concerns about their online AP experiences. A significant percentage of rural and low-income students either withdrew from online AP courses before completion, were given lower-than-average or failing grades in the course from the vendor (for local credit, some schools awarded students passing grades or grades higher than the vendor's for school credit), failed to take the AP exam even after completing and passing the course, or passed the course and took the exam but did not score high enough to receive college credit. Of the 25 rural and low-income students interviewed for this project, only a handful passed their online AP courses and were awarded college credit after taking the exam.

Among the critical issues raised by participants in the interviews were questions about:

- time spent in online learning
- pace of the course
- learning strategies
- course selection
- lack of preparation
- isolation
- lack of incentives
- problems with group work

- positive experience with vendor
- access to course texts
- mentor issues
- instructor issues
- attrition
- performance.

This report discusses:

- AP traditional and online course design issues raised by a recent study from the National Academy of Sciences, which concludes that AP courses should teach critical thinking and problem solving through increased opportunities for active learning and student interactions.
- Two programs—Pre-AP and GEAR UP—that may help rural and low-income students prepare for and succeed in AP and online AP courses and on the AP exams.
- Concerns related to online AP courses regarding the division of roles and responsibilities between online instructors and mentors.
- Ways for generating content help for students from local communities.

The report concludes that:

- Online AP courses, while offering students important opportunities they might not otherwise have, complicate the learning environment for rural and low-income students. For these students to succeed in online AP courses, they must be offered opportunities to prepare themselves to succeed in these courses.
- Online AP courses should be designed to promote active learning, student interaction, and group interaction.
- Because online AP courses tend to take at least one-third more time than traditional courses, students need access to computers outside of class. Ideally, they should have access to computers at home so they can work on these courses during evenings and weekends.
- The roles and divisions of responsibilities between online instructors and mentors need to be better clarified; we also need to find ways to offer students content help when there are no local teachers with subject matter expertise.

Further research is needed to:

- Define standards and guidelines for: vendors to design, pace, and teach online AP courses for rural and low-income students; schools to select, train, and monitor online instructors and mentors; and teachers and counselors to prepare and select students.
- Determine whether students are disadvantaged in online AP courses by not having access to computers at home.
- Develop descriptive and evaluative resources to help schools assess their students' specific needs for AP courses and identify courses that are designed and produced to meet those needs.

Background

The Western Consortium for Accelerated Learning Opportunities (WCALO) is a partnership of nine Western states that was launched in 2000 under a grant from the federal Advanced Placement Incentive Program (APIP). The states in WCALO are Arizona, Colorado, Hawaii, Idaho, Montana, New Mexico, Oregon, South Dakota, and Utah. The Consortium is administered cooperatively by the Colorado Department of Education and the Western Interstate Commission for Higher Education (WICHE). The WCALO's principal mission is to broaden access by increasing the number of rural and low-income students enrolling and succeeding in accelerated learning options, such as dual enrollment and advanced placement (AP) courses, and on the AP tests.[1]

The purpose of this special study was to examine low-income and rural students' experiences with online AP courses. This was an exploratory study. The availability of online AP courses is a recent development, and little has been written about it in general; the experience of low-income and rural students has received even less coverage. While online learning is now a common option for college students and other adults, offering these courses to high school students is only now evolving through virtual high schools and proprietary entities.

The APIP is administered by the U.S. Department of Education's Office of Elementary and Secondary Education (OESE). In addition to its major emphasis on assisting with fee reimbursement for low-income students who take AP examinations, the program provides grants to eligible entities to enable them to increase participation of low-income students in both pre-AP and AP courses and tests. The program also seeks to provide greater access to lower-income and other disadvantaged students to AP and pre-AP courses and the trained professionals who teach these courses. The focus of the program is to encourage disadvantaged students to participate and succeed in AP courses, thereby increasing the number of these students who may receive college credit for high test scores on AP exams.

One of the activities supported by WCALO involves assisting states and school districts to assess the viability of using online AP courses; the project also helps fund students to take these courses and AP exams. Many rural schools, in particular, lack the funds or teachers to offer AP courses in a range of subject areas. Online AP offerings from commercial vendors and virtual high schools give low-income students an opportunity to take AP courses and receive college credit, which they might not otherwise have had.[2]

Online learning, while growing rapidly in availability and popularity, remains a relatively new and unproven educational medium, whose design, pedagogy, and administration are as yet unstandardized and unregulated. Part of WCALO's mission is to help Consortium members identify quality providers of online AP courses and develop quality assurance indicators for courses, materials, and instruction.

Online AP offerings from commercial vendors and virtual high schools give low-income students an opportunity to take AP courses and receive college credit, which they might not otherwise have had.

Methodology

In this project, 30 students and their mentors at four rural high schools in two Western states were interviewed in April and May, 2002, about their experiences with online AP courses. School administrators at these schools also were interviewed.[3] They were informed in advance of the topics to be covered in the interviews (see Appendix A), which included:

- Demographic information about the school and its AP history
- The school's experiences with online AP, the vendor or vendors used, and the reasons for adopting online AP
- The school's experience with GEAR UP or other college preparedness programs and whether this factor has any implications for online AP
- Student selection processes for online AP
- Mechanisms in place to support students when they take online AP courses (i.e., on-site mentors for content, technology, general encouragement, access to computers, and student study groups)
- Time and other resource investments required by students and teacher-mentors for online AP compared with other AP or general courses
- Student access to computers at home
- Parental support for students taking online AP
- Funding for online AP registration, materials, and additional resources
- Teachers' and students' likes and dislikes related to online AP courses
- Technical or other problems with the course, how these were addressed and how quickly they were addressed by the course provider
- Perceptions about the online instructor, how quickly the instructor was able to respond to students' questions, and how helpful or effective those interactions were
- Student performance in online AP generally and in online AP courses
- Student plans to take the AP exam, registrations fees they are paying, and exam results
- Student plans to enroll in another online AP course in high school or an online course in college
- Suggestions for improving the online course experience
- Permission to follow-up with teachers and students with additional questions and to find out about their experiences on the AP exam.

Twenty-five students interviewed for this project met the criteria under the APIP to qualify for AP exam subsidies, meaning they could be classified as low-income.[4] The proportion of all students that are minority or low-income at the four targeted schools totaled at least two-thirds of the student body. Almost all students taking AP courses at these schools are in the top 10 to 15 percent of their classes, typically with grade point averages (GPA) of 3.5 or higher. All students interviewed for this project were juniors and seniors and reported plans to attend college. All but two of the students interviewed planned to attend college in their home state, at least initially.

At one school where interviews were conducted, several top students had been hand-picked to take online AP courses by the school's AP program mentor, who was a guidance counselor and actively involved in working with students to help them succeed. None of these students met the low-income criteria. These top students were described by their mentor as highly motivated, disciplined, and self-directed. All of these students seemed to thrive in traditional AP courses, and several had completed one or more online AP courses and were taking others at the time these interviews took place. All students in this group described themselves as highly experienced with computers and the Internet. They all indicated having access to computers and the Internet at home. They reported that their parents were very supportive of their taking online AP and other online and college-preparatory courses.

The students who participated in this project enrolled in a variety of online AP courses beginning in the spring term of 2001 and continuing through the 2001-2002 school year. These included general courses like U.S. and world history, English literature and composition, chemistry and more advanced courses like economics and physics.

Findings

The students and faculty interviewed for this project agreed that online AP is an intriguing idea because it offers rural students access to accelerated learning and college credit opportunities that they otherwise might not have. Most rural schools lack the resources to offer traditional AP courses to a small number of students. The principal at a school with two-thirds minority and low-income students and an enrollment of 20 students in two online AP courses in the 2002 spring term said that the school would be unable to offer AP or even many honors courses to its top students in certain subject areas except for the online AP option. In most instances, she said there either was not a qualified teacher in the subject or simply not enough funds to justify assigning a teacher to such a small number of students.

Most rural schools lack the resources to offer traditional AP courses to a small number of students.

Both students and mentors offered a number of positive observations about their experiences with online AP:

- *Interaction with Other Students.* Several students mentioned that they greatly appreciated, when time permitted, the opportunities to interact with students from other parts of the country through threaded discussions and chat sessions.
- *Familiarity with Computers and the Internet.* Regardless of whether they had access to computers and the Internet at home, all of the students interviewed indicated a high level of familiarity and proficiency with computers and the Web. This suggests that schools are providing adequate access to technology and training.
- *Ease of Navigation.* Students and mentors generally praised the ease of navigation within the online courses.
- *Positive Experience with Vendor.* School administrators, mentors, and students reported very positive experiences with the AP course vendor in dealing with the technical problems that emerged.
- *Student Collaboration.* A mentor we spoke with was excited about the degree to which students in the online World History AP course he supervised helped each other during the class. He felt that the students' support of each other was an extremely positive aspect of the online experience.
- *Self-Direction.* One mentor noted that students learned self-direction from taking the online course, especially in respecting deadlines.

The amount of time students are required to work on online courses outside of class means they most likely need access to computers and the Internet at home.

Notwithstanding these positive findings, most students and mentors interviewed for this project expressed frustrations with the design and implementation of the online AP courses. The principle concerns raised by students and faculty related to:

- *Time Spent in Online Learning*. Students commented that typically they were required to spend five to 15 hours outside class each week to complete work for the online class, a great deal more time, they said, than was typically required for a traditional course. These time investments are in addition to the five to 10 hours each week students spend working on online AP courses in class on school computers. The amount of time students are required to work on online courses outside of class means they most likely need access to computers and the Internet at home. At least one-third of students interviewed did not have computers at home. For students without access to home computers, the schools attempted to provide additional computer access after hours and on some holidays.

- *Pace of the Course*. Many students complained that the courses were too fast paced for them to keep up with assignments each week in a reasonable number of hours. At one school, a group of 15 students whose AP history teacher moved out of state shortly before the beginning of the school year were assigned to take an online AP course in world history. The students said they were required to submit three to seven essays each week of 800 to 1,000 words and then take a weekly exam. This intense pace meant there was little time to study or discuss topics, and students concluded that they learned less in the online format than in a traditional class. The pace also complicated interactions with the online course instructor. Instructors are required to respond to student emails within 24 to 48 hours, but students complained that this response time was too slow to help them keep up with assignments.[5]

- *Learning Strategies*. Students expressed concern about the structure of online AP classes, which required them to absorb copious amounts of text quickly and to exhibit what they had learned almost immediately in a weekly round of assignments and tests. They compared these experiences very negatively with traditional honors classes, where the emphasis is on problem solving and promoting a deep level of understanding of the material and the ability to apply core concepts.

- *Course Selection*. Other than a minimum GPA requirement defined by the schools, the students mostly self selected into or out of online AP courses. Course selection is important for these students though neither the students, faculty nor administrators had experience at the time we conducted these interviews to help students choose online AP courses in which they had a reasonable chance to succeed. Generally, students performed better in online AP courses in familiar subjects like English and history while they struggled with more specialized courses like physics and economics. This point is exemplified by the experience of a top student who took two different online AP courses—English and physics. This student struggled in physics, but excelled in her English course, a subject in which she typically performed well.

- *Lack of Preparation*. The schools and students lacked sufficient experience with online AP to be in a position to clarify expectations and develop strategies to deal more effectively with content and format. Students from both income groups reported difficulties understanding the material and keeping up in higher-level courses like chemistry and physics in which they had little prior experience and in which their mentors lacked subject matter expertise. A challenge at one school involved a mentor (i.e. the faculty member onsite at the school where students are taking an online AP course), who, while having a

background in general science subjects, was not well-versed in the complex material covered in the physics course and was therefore unable to offer significant help to the student.

- *Isolation*. Several students described their experiences in the online courses as too socially isolating to lead them to take other online courses. All low-income students indicated a strong preference for traditional classroom-based AP courses, commenting that they missed the direct interactions and discussions with teachers and other students that the classroom offered.
- *Lack of Incentives*. Some teachers and students felt there was little incentive for most students, even in rural areas, to struggle with the challenges of online AP courses when accelerated learning options like dual or concurrent enrollment in college courses at local community colleges also were available. Both states in which interviews were conducted offer concurrent enrollment programs, and several of the students we interviewed participated in these programs. Only one low-income student who had taken both online AP courses and a course at a local community college stated a preference for the online format because of its convenience. Where dual enrollment programs are available, only those students planning to attend colleges out of state or who need to complete coursework in subjects not offered in their high schools or local community colleges may be motivated to take online AP courses.
- *Problems with Group Work*. At one of the high schools, a group of 18 students taking an online AP world history course were frustrated with the barriers to their working together in groups to help each other get through the course. In this course, most students had formed study groups to help each other with the course but then were accused of cheating by the course instructor grading their tests.
- *Access to Course Texts*. Apparently, there were many problems with access to the course texts. Students had the option either to read course materials completely online or buy the texts. The schools did not always purchase the texts, and not all the students could afford to do so. But even when schools or students did purchase the texts they often arrived late, many weeks into the courses. Students who were forced to read all material online were uncomfortable with this option.
- *Mentor Issues*. Only in two of the online AP courses taken by the students interviewed for this study, did mentors classify themselves as subject matter experts. Students taking the courses with mentors who were not subject matter experts felt they were at a disadvantage, particularly when struggling with challenging subjects like physics and economics. In these situations, students did not feel the online instructor was able to provide the level of assistance they needed. One student who is at the top of her class said that the greatest challenge she encountered taking an online AP physics class was that the mentor could offer little substantive help; her exchanges with the online instructor, who she described as reasonably responsive, also did not help her. She passed the course with a grade below her average and did not take the AP physics exam.
- *Instructor Issues*. According to both students and mentors, the quality of the facilitation in the courses was mixed. Some students described the instructors as available, helpful, and flexible. Several other students thought their instructors were difficult and unduly rigid, especially regarding requests for additional time to complete assignments, or lax in responding to them in a timely fashion. The mentors commented that the vendor was responsive and helpful in dealing with complaints about instructors. The perception of both students and mentors was

Where dual enrollment programs are available, only those students planning to attend colleges out of state or who need to complete coursework in subjects not offered in their high schools or local community colleges may be motivated to take online AP courses.

that the course instructors functioned more as facilitators rather than as "teachers": the focus of the online instructors seemed to be primarily to keep students on track and grade submissions. Few of the low-income students had prior experience with instructors functioning in this kind of facilitative role. A majority of students said they missed the exchanges—the "give and take"—with their teachers and other students that is characteristic of the traditional classroom experience.

- *Attrition.* At one of the schools, six students initially registered to take an online AP English course offered during the 2001-2002 school year. Within weeks, only two students remained (both completed the course). One of them thought the students who dropped the class were not prepared for its intense pace and out-of-class time investments.
- *Performance.* Nearly all low-income students interviewed who completed an online AP course received acceptable scores in the course from their schools, although many students said the assigned grade tended to be lower than what they received in most of their other courses. Only a handful of these students took the AP exam and received scores sufficient for an award of college credit.

Observations

The experiences of low-income and rural students and their mentors interviewed for this project raise interesting questions about how best to design and deliver online AP courses. Because online education is a relatively new instructional medium, there are few empirical studies available upon which to base firm conclusions about what does and does not work in the online environment. Much of the current literature in the field remains anecdotal and opinion-based.[6] To date, there are no studies or evaluations that assess either the efficiency or efficacy of online learning opportunities for underrepresented populations of high school students. This is the focus of WCALO's ongoing special study.

Fundamental Concerns of Students and Mentors

Many of the problems and frustrations that the interviewed students encountered with the online AP courses are attributable to the inevitable glitches and participant inexperience one might expect in any new and unfamiliar educational venture. For example, it is the vendor's policy that students are sent the text and other materials prior to the start of the course. Thus, most of the delays noted by students and mentors connected with delivery of course texts were likely blunders. In time, many of these issues will self correct or solutions will become readily apparent.

However, some of the complaints that rural and low-income students have about online AP courses could reflect more systemic problems. Below is a brief analysis of some of the fundamental concerns students and mentors raised about their experiences with online AP courses.

Higher Orders of Competence

One frustration with online AP courses raised by virtually all low-income students interviewed for this project was that the courses relied too heavily on reading text and taking tests and did not focus enough on problem solving and activities the students felt led them to a deeper understanding of the material and concepts, which many said they were accustomed to experiencing in traditional classes. As a result,

Many of the problems and frustrations that the interviewed students encountered with the online AP courses are attributable to the inevitable glitches and participant inexperience one might expect in any new and unfamiliar educational venture.

many students said they felt something important had been lost in the translation from traditional AP classes to the online format. Is this problem inherent in the online learning format, thus rendering online learning inferior to traditional classes? Or, is it possible to address this issue by better adapting traditional teaching principles to online education?

A recent report from the National Academy of Sciences (NAS), based on a study sponsored by the U.S. Department of Education and the National Science Foundation, suggests that some student concerns regarding learning strategies and the pace of coverage in online AP courses are not limited to the online medium.[7] The NAS report concentrates on biology, chemistry, physics, and mathematics in AP and International Baccalaureate (IB) programs in U.S. secondary schools, although the recommendations seem applicable to all subject areas. The report concludes that high schools offering advanced study opportunities should focus more on helping students understand central concepts and less on mastering huge amounts of superficial information very quickly.

Jerry P. Gollub, co-chair of the committee responsible for drafting the report and professor of physics at Haverford College, observed that the primary aim of programs such as AP and IB should be to help students achieve deep understanding of the content and unifying ideas of science and math. "Well-designed advanced programs must provide opportunities to experiment, critically analyze information, argue about ideas, and solve problems," he said. "Simply exposing students to advanced material or duplicating college courses is not by itself a satisfactory goal."[8]

In March 2002, the National Education Association (NEA) and Blackboard, Inc., one of the leading learning-management-system vendors, issued a set of research-based quality benchmarks for distance learning in higher education.[9] The study was conducted for NEA and Blackboard by the Institute for Higher Education Policy (IHEP). The benchmarks are based on practical strategies in use at U.S. colleges considered leaders in distance education. While there appear to be no studies yet available evaluating the application of these strategies to online education in secondary schools, some virtual high schools appear to draw on similar strategies when offering online courses to high school students.

The guidelines recommended by the NEA/Blackboard study in the areas of course development, teaching, course structure, and student support and evaluation that offer the best chances for making online courses as effective as courses delivered face-to-face include the following:

- Courses are designed to require students to engage themselves in analysis, synthesis, and evaluation as part of their course and program requirements.
- Student interaction with faculty and other students is an essential characteristic and is facilitated through a variety of ways, including voice mail and/or email.

These standards suggest that one element of a well-designed and executed course, no matter what its format, is an appreciation of the fact that information is not in itself education. While the Internet is effective for disseminating information, the mere experience of students reading and then being tested on their review of vast quantities of material over the Web — or in any other format — does not ensure that learning has occurred.

The essence of education lies in the thoughtful application of the fundamental principles, standards, and strategies of instructional design and implementation aimed at addressing the needs of specific audiences in ways that spark deeper levels of comprehension based in the learner's growing ability to make use of the material and concepts for defined purposes.[10] For example, a student may read hundreds of

While the Internet is effective for disseminating information, the mere experience of students reading and then being tested on their review of vast quantities of material over the Web — or in any other format — does not ensure that learning has occurred.

pages about creative writing theories and approaches and learn something from the effort. However, the educational experience is qualitatively different when the student moves from passive efforts to absorb information to using the underlying concepts to craft a moving short story in response to substantive feedback from an inspired instructor and other students.

Most experts in the emerging field of online education pedagogy agree that, despite the challenges posed by the online environment for students of all demographics, online courses can be made highly effective by following certain guidelines.

Interaction in Online Learning

Most experts in the emerging field of online education pedagogy agree that, despite the challenges posed by the online environment for students of all demographics, online courses can be made highly effective by following certain guidelines. For example, experts recommend:

- Giving students substantial opportunities for interaction not only with the course materials but also with the instructor and other students.
- Emphasizing active learning strategies that rely heavily on exercises, interactivities, and projects designed to meet the specific needs of the audience and the objectives for covering the topics and materials.
- Training instructors so they become skilled in using the accepted practices for good teaching in the online format.[11]

According to experts in learning theory and application, interaction is one of the most important instructional elements of distance education.[12] Some experts believe that interaction is especially important if distance education is to overcome the "transactional distance" caused by physical and psychological separation of learners and instructors.[13] Research also shows that interaction is critical for learning outcomes and learner satisfaction.[14]

As with traditional classes, online learning works best when grounded in active learning approaches that are designed to be highly interactive and project oriented. Unlike students in most traditional classes, however, students taking a well-designed instructor-led online class have no choice but to participate actively in the course and to take individual responsibility for their learning experiences. This suggests a vast potential for the future of online education to enhance learning opportunities for many students who are adequately prepared for these experiences and have access to the necessary resources. Thus, despite the problems encountered with online learning in these early stages of its implementation, schools should not be dissuaded from offering online courses or hybrid courses integrating elements of online and traditional classes. In the not-too-distant future, online learning will be an accepted and critical part of children's global, technological, and lifelong learning experiences.

Group Work and Overcoming Isolation

According to most students in these interviews, there is one design change for online AP courses that should be simple to implement, would benefit rural and low-income students when taking online AP courses, and is consistent with NEA's recommendation to encourage students at the same school taking the same online AP course to engage in group work. The students and mentors interviewed for this project felt that group interactions helped the students become more efficient in covering the material and fostered a great deal of productive discussion, support, and learning among the participants. The group dynamic also helped these students overcome some of the isolation many considered the main shortcoming of online learning.

Despite the apparent value of group support during online learning classes, there can be a downside: several students in one online AP course who worked together in a study group were accused of cheating because their responses to essay and other test questions were too similar. While concerns about cheating and plagiarism in online learning forums are legitimate, the predominant concern must always be how to design and deliver online courses that meet the needs and objectives of the audience while promoting quality learning experiences.

Time Commitment and Pacing

Online AP courses require students to spend a significant amount of time working at school, using school computers, as well as working out of class, ideally on a computer at home. The course vendor is clear that students can expect to spend between 10 and 15 hours each week working on an online AP course and eight to 10 hours in a regular online course. This is consistent with the time commitment students reported. Most of the students perceived this time commitment as excessive, claiming it was one third more time than most students are accustomed to investing each week in a traditional course.

Regardless of how well a course is designed and implemented, online learning tends to take more time, both for instructors to develop and teach and for students to complete. It is important that, before students enroll in an online course, they understand what is involved.

Of greater concern for rural and low-income students are issues connected with the pace of the course. Most low-income students interviewed for this project described the pace of the online AP course as blistering. The students said they did not feel they had enough time to keep up with the readings, assignments, and tests, much less grapple with the material and concepts in ways likely to spur more meaningful learning.

This course-pacing issue seemed of special concern for most of the low-income students. The five students interviewed for this project who did not meet the low-income criteria perceived the pace of online AP courses generally to be intense, albeit manageable. Additional research is needed to confirm and explain any differences regarding online course pacing between low-income and other students. More research also is needed before specific recommendations can be made about whether and how to adapt the pace and coverage of online AP and other online courses for the needs of specific student populations while still meeting the course's learning objectives.

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AP Preparedness Programs

The recent NAS report referenced in the prior section urges educators to work to make AP and other courses available to more students who could benefit from them, especially minorities and those attending rural and inner-city schools. The report notes that the number of AP programs in a school tends to decrease as the percentage of minority or low-income students increases. Even when college-level courses are available, studies show that these students may not be sufficiently encouraged to take them, nor nurtured to succeed in them after enrollment. A lack of well-prepared teachers and the inadequacy of students' prior schooling are two factors that seem to shrink the number of prospective participants.

The NAS report further suggests that educators and researchers explore the development of alternative programs for advanced study in the nation's high schools

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and evaluate new and promising approaches. The availability of more alternatives could increase students' access to advanced study and lead to innovative and effective teaching strategies.

Several mentors and school administrators interviewed for this project suggested that rural and low-income students needed better preparation if they were to succeed in AP courses generally and especially in online AP courses. As one AP teacher quoted on the College Board Web site said, "Advanced Placement is not a program for the elite, but a program for the prepared."

Traditional AP courses are designed to be challenging, even for top students, who typically have advantages not available to rural and low-income students: access to trained and qualified AP instructors, a wider number and range of AP courses, and programs that prepare them before high school to take and succeed in AP courses.

An in-depth investigation into the college preparatory programs available for rural and low-income students and an assessment of their efficacy is beyond the scope of this report, however. Two programs—the College Board's Pre-AP Program and the U.S. Department of Education's GEAR-UP Program—deserve mention because of the potential these programs offer to students in grades six through 12 in preparing for accelerated learning programs in high school.

College Board's Pre-AP Program

According to the College Board, "pre-AP" is a suite of K-12 professional development resources and services. The purpose of the pre-AP initiative is to equip all middle and high school teachers with the strategies and tools they need to engage their students in active, high-level learning, thereby ensuring that all middle and high school students develop the skills, habits of mind, and concepts they need to succeed in college.

The College Board encourages middle and high school teachers to work together in "vertical teams." According to the College Board, an AP vertical team is:

> A group of teachers from different grade levels, typically grades six through 12, in a given discipline who work cooperatively to develop and implement a vertically aligned program aimed at helping students acquire the academic skills necessary for success in the Advanced Placement Program. Some AP Vertical Teams also include district administrators, principals, curriculum coordinators, and guidance counselors.[15]

Many AP vertical teams include elementary teachers, and still others include community colleges and other higher education institutions. The College Board does not design, develop, or assess courses labeled "pre-AP." Instead, the College Board offers workshops for teachers, administrators, and others interested in helping students from middle school succeed in AP courses.

GEAR UP

The Gaining Early Awareness and Readiness for Undergraduate Program (GEAR UP), enacted in 1998, is a federal program administered by the U.S. Department of Education that seeks to bridge the college opportunity gap for low-income students. As reported by the National Center for Education Statistics (*Condition of Education, 1999*), 47 percent of low-income high school graduates immediately enroll in college or trade school, compared to 82 percent of high-income students. Only 18

percent of African Americans and 19 percent of Hispanic high school graduates earn a bachelor's degree by their late twenties, compared to 35 percent of whites.

GEAR UP's focus is early intervention. Research shows that students taking challenging courses (including algebra) in middle school are much more likely to succeed in high school. Beginning with students in the seventh grade and going through high school graduation, the program funds partnerships between high-poverty middle schools and colleges and universities, community organizations, and businesses, which work with entire grade levels of students. The partnerships provide tutoring, mentoring, information on college preparation and financial aid, an emphasis on core academic preparation and, in some cases, scholarships. Stronger academic preparation, beginning early in middle school, should put more low-income students on track to compete and succeed in the college of their choice.

Instructor/Mentor/Student Selection Criteria and Roles

Online courses typically are classified as instructor-led or self-paced. Instructor-led courses are considered comparable to those taught by an instructor in a classroom. Self-paced courses are those in which students work independently with the course content without the assistance of an instructor.

Based on their experiences with online AP courses, students interviewed for this project suggested that the instructor-led online course category had two subcategories: one for instructors who functioned in a role analogous to that of a classroom teacher and the other for instructors whose major role appeared to be one of keeping students on track in the course and grading student submissions. In the latter case, the students interviewed felt that the virtual classroom provided much less of the substantive interaction they were accustomed to in the traditional classroom.

Many students interviewed for this project described the instructor role as they experienced it in online AP courses as more facilitative than instructive. The difference between these roles was critical to these students because they generally felt inadequately prepared to function effectively either intellectually or socially in an environment where there was minimal opportunity for interaction with the instructor and with other students.

The online AP courses in which the students participated are designed to be facilitated by an online instructor and monitored at the school by a teacher-mentor assigned to each course. According to the vendor, the online instructor:

- Is trained in online instruction and the online learning environment or platform.
- Is experienced in teaching the subject.
- Comments on student work, grades papers and exams.
- Responds to students' questions.
- Along with the mentor, tracks students' performance and progress.
- Works with the mentor to motivate and encourage students to do their work and to succeed in the course.

Mentors, by comparison, are expected to:

- Be comfortable with technology.
- Ensure a solid start by students.

The online AP courses in which the students participated are designed to be facilitated by an online instructor and monitored at the school by a teacher-mentor assigned to each course.

▲ Monitor students' progress through weekly meetings and with online tools.

▲ Work with the online instructor to motivate and encourage students to succeed.

The criteria the vendor identifies for designating a mentor for an online AP course does not include a requirement that the mentor be a subject-matter expert. If the mentor lacks subject matter expertise and a student is experiencing difficulty getting the level of substantive assistance needed to proceed through the work, this can lead to extreme frustration for the student.

In situations where the mentor does not have the requisite subject matter expertise, the obvious solution is for the online instructor to find a way to speak with the student directly to attempt to diagnose problems, suggest corrective actions, and follow-up to make sure that the student is back on track.

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It is unclear the extent to which the frustrations that many students experienced with online AP courses can be attributed to instructor and mentor issues. It also is not clear whether problems in this area are traceable to possible limitations of at-a-distance communication, and whether discussions by phone or videoconferencing could help to overcome them.

Notwithstanding this, the interviews for this project revealed a couple of situations—one with low-income students and one with the five students who did not qualify for low-income status—where mentors who were extremely attentive and involved seemed to make a significant difference in how the students performed in the course and whether they perceived the experience as positive or negative.

Recommendations

Below is a list of recommendations based on conclusions that can fairly be gleaned from the interviews conducted in this project with rural and low-income students and their mentors:

1. For rural and low-income students to succeed in online AP, they should be offered opportunities for advanced preparation which are equivalent to the advantages more privileged students receive from the fertile, supportive learning environments in which they have been immersed throughout their lives. Online AP is perceived as one option to help level the playing field between privileged students and low-income students. Given the inherent challenges low-income students encounter in taking AP courses, however, adding the online format to the mix only complicates matters for these students. Course developers and vendors should:

    ▲ Consider whether and how to design online courses that engage students in interactions, projects, and exercises which spark deep levels of understanding through application of concepts and problem solving skills.

    ▲ Adapt the pace of coverage of online courses to the needs of rural and low-income students.

    ▲ Encourage group work and identify other strategies to help overcome the social isolation involved in online learning.

2. Undertake data-driven or other policy research to clarify incentives for rural and low-income students to take online AP courses, compared with other accelerated options, and determine whether there are adequate incentives for these students to take and complete online AP courses on a scale that would widely benefit this population.

3. Assuming online AP continues to be viewed as beneficial for rural and low-income students, more research is needed to identify and assess how to prepare them to succeed in online AP courses and on AP exams. Research also is needed on the criteria for selecting students to participate in online AP courses and for defining prerequisites for specific courses to help ensure success. These measures should help diminish attrition rates and increase performance of students in courses and on AP exams.

4. The College Board should sponsor studies leading to the definition of standards and guidelines for vendors and virtual schools to use when developing and delivering online AP courses and selecting and training instructors and mentors, especially for courses offered to rural and low-income students. The NAS report calls on the College Board, the sponsor of the AP program, to exercise greater quality control by spelling out standards for what constitutes an AP course, the kind of student preparation expected, and strategies for ensuring equity and access.[16]

5. Additional research is needed to determine the impact of limited access, both in school and outside of school, to computer and Internet service at home and how to provide computers to rural and low-income students to improve their performance in online AP and other online courses.[17]

6. Schools and vendors should clarify the roles and division of responsibilities between online instructors and mentors. If mentors are not experts in the subject being taught and cannot answer students' substantive questions, it will either be necessary for the online instructor to be especially responsive to student questions or other alternatives considered. This may include the need for the online instructors to make themselves available for phone discussions with students.

7. Schools that decide to offer online AP courses must be mindful of their students' profiles and special needs when evaluating and choosing courses and vendors. The online AP courses offered to the low-income students involved in this project may not have been appropriately designed and delivered to fully engage these students in an effective educational experience. The resources most likely to be of help include descriptive and evaluative reviews of online course products developed for high school students (and specific categories of students, such as the rural and low-income students who participated in this project) by commercial vendors and virtual high schools.[18]

   Alternatively, school districts or individual schools might generate volunteer content tutors from the local community for students taking online AP courses. Examples of community help that might be available include engineers for advanced math subjects, chemists, biologists, and other scientists for the sciences, and bankers for financial and economic subjects. Schools also might draw from a pool of local community college or university students who could be offered credit to tutor high school students in subjects in which they are majoring and hold significant college credit.

Implications for Public Policy

This report has highlighted some of the strengths and concerns around providing online advanced placement courses to students. The study attempted to focus primarily on rural and low-income students' experiences and to ascertain if there were differences in the experiences of these students as compared to other students in AP online courses. While this is just an initial glimpse into the complex area of online advanced placement courses, several issues have emerged that are worth examining further at the school, district, and state level. Among these issues are many that may impact state public policy.

Preparation

Initial reports from some vendors indicate that there are high percentages of students withdrawing from online AP courses, in addition to a high percentage of students who do not take the AP exams even when they complete the courses with passing grades. These reports raise questions about the value of continuing support from federal and state funds to promote accelerated learning online, at least until the issues with student performance are fully understood and can be addressed effectively.

Regarding the experiences of disadvantaged students in online AP courses, should schools encourage students to participate in online learning experiences for which they do not appear to be ready? In fact, several students in this study commented that their experiences with online AP classes had negatively colored their views of online learning and AP courses generally. Some students indicated feeling that failure in these courses was a foregone conclusion. This raises concerns about whether limited funding resources should be invested in any initiative where certain categories of students seem likely to fail, unless measures are taken to solve the problems leading to their failure.

If federal and state funds continue to be used to support AP courses, delivered either in the traditional classroom format or online, at a minimum, there must be some assurance that all students will receive the preparation and support services they need to have the best chance for passing the course, taking the exam, and receiving AP college credit.

If rural and low-income students lack access to technology needed to complete assignments, online courses do not help to level the playing field for these students.

Access

Students participating in the interviews for this report indicated that it took them 10 to 15 hours per week, or at least one-third more time and work, to complete an online AP course compared with a traditional honors or AP course. Between one-third and one-half of the students who participated in these interviews did not have access to computers at home. While the schools attempted to extend access to computers on campus, usually for a few hours before or after school, most schools lacked the resources to give extensive access to equipment in the evenings, on weekends, or over holidays. Most students felt they were disadvantaged by being unable to work on course assignments at home. If rural and low-income students lack access to technology needed to complete assignments, online courses do not help to level the playing field for these students.[19]

Funding

States are facing tight budget times, and this is likely to continue for at least the next two to five years. This outlook does not bode well for special programs and student support services in either K-12 or higher education. Nonetheless, if state priorities include having well-prepared students who are ready to achieve in college-level work and providing that opportunity to rural and low-income students on an equal basis with higher income students, then fiscal support must be enhanced for accelerated learning programs. Funding is needed to provide fee reimbursement for low-income students who take AP examinations. It also is essential to support professional development opportunities for teachers and counselors, to foster research, to build online access, and to establish new programs in schools with high proportions of students from disadvantaged families. Without the fiscal support at all levels—local, state, and federal—there will not be equal access to accelerated learning options for low-income students.

Concluding Remarks

Only limited conclusions can fairly be drawn from our interviews with rural and low-income students regarding their experiences with online courses generally or online AP courses specifically. This project was not intended as an empirical study, nor were the students who were interviewed asked to participate at random. Our goal was simply to gather preliminary responses about their online AP learning experiences directly from rural and low-income students who were taking or had taken these courses.

A full assessment of what really helps rural and low-income high school students succeed in the online environment and in AP courses generally must await data-driven analysis and inquiry. Nevertheless, our interviews suggest that some students could do well with online learning in AP courses if they were adequately prepared and motivated and if they had access to effective course design, implementation, instruction, and mentoring on the part of those responsible for delivering and facilitating the courses.

Endnotes

[1] The Advanced Placement (AP) Program was launched in 1955 by the College Board as a collaborative effort between secondary schools and colleges and universities. See the College Board's Web site at http://www.collegeboard.org. The Advanced Placement program was devised to offer "motivated" high school students the chance to take college-level courses in high school. These courses are taught by high school teachers who follow course guidelines developed and published by the College Board. Students taking AP courses may earn college credit by taking the AP exam at the completion of the course and receiving an adequate score.

[2] About 43 percent of all high schools in the country do not offer AP courses. See Lorenzo, G. "Online Advanced Placement: A New Way to Prepare for College," 2001 <http://www.edpath.com/images/ap%20online.pdf> (27 Sept. 2002).

[3] Initially, we hoped to identify three or four states in which we could interview eight to 10 rural and low-income students at approximately three schools in each state. However, most states that we contacted are not yet offering online AP courses widely to rural and low-income students. Some states want to explore ways to assess whether preparatory programs like pre-AP should be used to improve opportunities for success for rural and low-income students taking online AP.

[4] The Advanced Placement Fee Reduction program seeks to remove financial barriers that prevent low-income students from taking AP tests. Eligible low-income students pay a $5.00 fee for each examination if they are enrolled in one or more AP classes, plan to take the end-of-course AP exam, and meet one of the three criteria:

- Student comes from a household whose taxable income for the preceding year did not exceed 200 percent of the poverty level.
- Student is eligible for federal free or reduced meal programs.
- Student attends a school where at least 75 percent of all pupils enrolled are eligible for federal free and reduced meal programs.

[5] At one school, funds to support students taking online AP courses became available one-third of the way into the 2000-2001 school year. A group of 18 students was assigned to participate in an online AP course in world history. However, these students were required to compact a full-year's set of assignments into the second-half of the school year. While most of the students completed the course, only five took the AP exam and none received a score above "1." The experience seemed to have negatively colored these students' views of online learning generally: few had anything positive to say about the possibilities for online learning.

[6] See "California Virtual School Report: A National Survey of Virtual Education Practice and Policy with Recommendations for the State of California," University of California College Preparatory Initiative (UCCP), 2002 <http://www.edpath.com/images/VHSReport.pdf, p. 11> (28 Sept. 2002).

> Online learning is a relatively new phenomenon and, as such, there is not yet a complete body of research to guide policymakers, instructional designers, teachers, or students. In higher education and corporate and military training, areas where online learning started and is most highly developed, there are debates about what constitutes sound pedagogy. At the high school and K-8 levels, there has been an acceptance of electronic education as valuable, efficient, and appropriate for certain situations or certain students, but research into the efficacy of electronic education is not yet comprehensive.

[7] "Learning and Understanding: Improving Advanced Study of Mathematics and Science in U.S. High Schools," National Research Council, 2002 <http://www.nap.edu/books/0309074401/html/> (28 Sept. 2002).

[8] Gollub, J., and P. Curtis Jr. "Better Learning in High School Science and Mathematics," National Academy of Sciences (NAS), 2002 <http://www4.nas.edu/onpi/oped.nsf/(OpEdByDocID)/91750DB2100E868285256BA00074EF14?OpenDocument> (27 July 2002).

[9] "Quality on the Line: Benchmarks for Success in Internet-Based Distance Learning," The Institute for Higher Education Policy, 2000 <http://www.ihep.com/Pubs/PDF/Quality.pdf>. See also *Good Practices in Distance Education* (Boulder, CO: Western Cooperative for Educational Telecommunications, 1997).

[10] See the indicators for engaged learning from Jones, B.F., G. Valdez, J. Nowakowski, and C. Rasmussen. "Designing Learning and Technology for Educational Reform," North Central Regional Educational Laboratory (NCREL), 1994 <http://www.ncrel.org/sdrs/areas/issues/content/cntareas/math/ma2lindi.htm> (27 July 2002).

- *Responsible for Learning.* Students take charge of their own learning and are self-regulated. They define learning goals and problems that are meaningful to them; understand how specific activities relate to those goals; and, using standards of excellence, evaluate how well they have achieved the goals. Successful, engaged learners also have explicit measures and criteria for assessing their work as well as benchmark activities, products, or events for checking their progress toward achieving their goals.
- *Energized by Learning.* Engaged learners find excitement and pleasure in learning. They possess a lifelong passion for solving problems and understanding ideas or concepts. To such students, learning is intrinsically motivating.
- *Strategic.* Engaged learners continually develop and refine learning and problem-solving strategies. This capacity for learning how to learn includes constructing effective mental models of knowledge and resources, even though the models may be based on complex and changing information. Engaged learners can apply and transfer knowledge in order to solve problems creatively and they can make connections at different levels.
- *Collaborative.* Engaged learners understand that learning is social. They are able to see themselves and ideas as others see them, can articulate their ideas to others, have empathy for others, and are fair-minded in dealing with contradictory or conflicting views. They have the ability to identify the strengths and intelligences of themselves and others.

[11] See Hiltz, S. R., R. Benbunan-Fich, N., Coppola, N. Rotter, M. Turoff, M. "Measuring the Importance of Collaborative Learning for the Effectiveness of ALN: A Multi-Measure, Multi-Method Approach," *Journal of Asynchronous Learning Networks* 4, no. 2 (2000).

> When students are actively involved in collaborative (group) learning online, the outcomes can be as good as or better than those for traditional classes, but when individuals are simply receiving posted material and sending back individual work, the results are poorer than in traditional classrooms.

See also Ko, S., and S. Rossen. *Teaching Online: A Practical Guide* (Boston: Houghton Mifflin Co., 2001). Hanna, D., M. Glowacki-Dudka, and S. Conceicao-Runlee. *147 Practical Tips for Teaching Online Groups* (Madison, WI: Atwood Publishing, 2000). Moore, G., K. Winograd, and D. Lange. *You Can Teach Online: Building a Creative Learning Environment* (New York: McGraw-Hill Higher Education, 2001). The author wishes to thank Professor Patti Shank of the University of Colorado-Denver Information & Learning Technologies Program for sharing her research and insights about interactive online course design and pedagogy based on the unpublished manuscript "Instructional Interaction in Online Courses: Definitions, Importance, and Applications" (31 March 2002), from which several of the references for this section were drawn.

[12] King, J. C., and Doerfert, D. L. "Interaction in the Distance Education Setting," 2001 <http://ssu.missouri.edu/ssu/AgEd/NAERM/s-c-4.htm> (6 June 2000).

[13] Moore, M. G. "Three Types of Interaction," *American Journal of Distance Education* 3, no. 2 (1989), 1-6. "Distance Education Theory," *American Journal of Distance Education* 5, no. 3 (1991).

[14] Anderson, S. E., and J.B. Harris. "Factors Associated with Amount of Use and Benefits Obtained by Users of a Statewide Educational Telecomputing Network," *Educational Technology Research and Development (ETR&D)* 45, no. 1 (1997), 19-50. Fulford, C. P., and Zhang, S. "Perceptions of Interaction: The Critical Predictor in Distance Education," *American Journal of Distance Education* 7, no. 3 (1993), 8-21. Gunawardena, C., N., and F. J. Zittle. "Social Presence as a Predictor of Satisfaction within a Computer-Mediated Conferencing Environment," *American Journal of Distance Education* 11, no. 3 (1997), 8-26. Lou, Y., P. C. Abrami, and S. d'Apollonia. "Small Group and Individual Learning with Technology: A Meta-Analysis," *Review of Educational Research* 71, no. 3 (2001), 449-521. Kearsley, G. "Online Education: New Paradigms for Learning and Teaching," *The Technology Source*, 2002 <http://ts.mivu.org/default.asp?show=article&id=73> (23 July 2002).

[15] See <http://apcentral.collegeboard.com/article/0,1281,153-175-0-10459,00.html> (25 Sept. 2002).

[16] There is precedent for the kind of study the College Board would need to commission to identify and address the needs of rural and low-income students taking online AP courses. The College Board currently is sponsoring a study to "identify measures or indicators that will ultimately lead to increased numbers of minority students succeeding in AP courses." See Bruschi, B., M. Yepes-Baraya, N, Burton, and P. Herron. "Minority Student Success: The Role of Teachers in AP Courses," <http://www.collegeboard.com/ap/research/abstract7.html>.

[17] See "Internet Access in U.S. Public Schools and Classrooms: 1994–2001," National Center for Education Statistics, 2002 <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2002018> (29 Sept. 2002).

> In 2000, 21 percent of children in the nation used the Internet at home for school-related tasks. . . . Making the Internet accessible outside of regular school hours allows students who would not otherwise have access to the Internet to use this resource for school-related activities such as homework. . . . In 2001, 51 percent of public schools with access to the Internet reported that they made computers with access to the Internet available to students outside of regular school hours. . . . Among schools providing computers with access to the Internet to students outside of regular school hours in 2001, 95 percent made them available after school, 74 percent before school, and 6 percent on weekends. Availability of computers with Internet access before school decreased as minority enrollment increased-from 84 percent of schools with the lowest minority enrollment to 66 percent of schools with the highest minority enrollment. A similar pattern occurred by poverty concentration of schools for the availability of computers with Internet access before regular school hours. <http://nces.ed.gov/pubs2002/internet/4.asp> (27 Sept. 2002).

See also Jones, B., G. Valdez, G., J. Nowakowski, C. Rasmussen. "Policy Issues in Using Technology for Engaged Learning," *Plugging In: Choosing and Using Educational Technology*, EdTalk: North Central Regional Educational Laboratory (NCREL), 1995 <http://www.ncrel.org/sdrs/edtalk/policyis.htm> (27 Sept. 2002).

> **Equity:** Technology is a tool that gives everyone an equal chance to learn. Given its significance in national and local policy, the first issue concerns equity, or the goal of universal participation. . . . Universal participation, as a policy goal, means that all students in all schools have access to and are active on the information highway in ways that support engaged learning. Inequities will be reduced because everyone will have equal access and equal opportunity to learn. However, the danger is that many poor schools will be precluded from these learning activities. . .

[18] See annotated bibliography for research on virtual schools.

[19] See Stock, E., "Computers for Youth: Focusing Digital Divide Efforts on the Home," 2002 <http://www.digitaldividenetwork.org/content/stories/index.cfm?key=107> (29 Sept. 2002).

> As a nation, we have spent billions of dollars equipping schools, libraries and community centers with computers and Internet access. What has been left behind is the home. While 93% of families earning more than $75,000 per year own home computers, only 40% of families earning less than $30,000 per year own them (Woodward, 2000). The research suggests that the numbers of low-income families owning home computers has stabilized (it was 41% in 1999 and 40% in 2000). Providing access to computers in school, libraries and community technology centers, while necessary, is not sufficient. The lack of public support for home computer projects has significant educational consequences. It forces children with no home computer to do much of their homework away from their family, staying late after school or visiting a community center or library just to do their research and writing. It is a missed opportunity for parents to learn about the school curriculum and become more involved in their child's education. And, it presents obstacles for teachers who wish to incorporate technology into their lessons but have students with little ability to practice their computer skills outside the classroom.

The Digital Divide Network at http://www.digitaldividenetwork.org, sponsored by the Benton Foundation (http://www.benton.org) has a wealth of resources on technology access issues both generally and for K-12 students.

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Interview Questions

Questions for State Programs

a. Are you sponsoring special programs to enroll underserved populations of students in online Advanced Placement courses?
   - Please describe the program or other support you offer schools and underserved students to enroll and support them to take Advanced Placement courses, both general and online.
   - How do you identify target schools and students for this program?

b. Do you track results for students taking online Advanced Placement courses?
   - Do you track results for the general population of students?
   - For underserved students?
     - How many students completed the online AP courses?
     - How many took the AP exam?
       - How many were awarded point toward college based on the AP exam?
   - What is your impression of the experiences in your state with online AP courses generally? With online AP courses offered to students in the underrepresented demographic categories?

c. Who are the online AP providers from which students in your state are taking AP courses? Are any high schools using virtual schools or other providers than Apex? Do you have any data you can share with us evaluating the AP courses given by these providers?

d. Can you help us identify schools where underserved students have taken or are taking online AP courses and help us identify teachers and mentors as well as underserved students to interview? Can you help us get contact information for the principals, counselors, mentors and, students at these schools we can interview to investigate their experiences with online AP activities?

Questions for Schools/Teachers/Mentors

a. Are you working with underserved students in enrolling and supporting them in taking online Advanced Placement courses or any other online courses? What criteria would you use to classify as student as a member of an underserved population?

b. How do you identify target students?

c. Student Services
   - What support (human, technical, academic) is offered to students before and during their enrollment in online Advanced Placement and/or in online courses generally?
   - Do students receive an orientation course for online courses generally? For online AP courses? Who provides the orientation? What kind of orientation is it? In your opinion, is the orientation adequate?
   - What support is offered to students while taking online courses?
   - Do you counsel students who are considering taking online general and AP courses? What factors do you consider important and convey to students about how to succeed in an online course generally? In an AP course? Do you request that students notify you if they are considering dropping out of the course so that you counsel them? Have you had experiences working with students who thought about dropping out of a course but who stayed after discussing the situation with you? If so, what is your view of how well these students performed in the online course? In the AP exam?

d. Are you tracking the results of underserved students taking online courses? What are the results?
   - How many students were enrolled in Advanced Placement or other online courses?
   - Of the students who failed to complete the online courses, why did they not complete the course?

Appendix A

Interview Questions

- How many students went on to take the advanced placement exam? If they passed online AP course and did not take exam, why not? How does the percentage of students who complete online course and go on to take AP exam compared with traditional AP classroom courses?
- Were the online courses evaluated and did students fill out evaluation forms?

c. Have you interviewed students about their experiences in taking Advanced Placement or other online courses? Have you discerned any patterns about why underserved students do or do not succeed in online courses generally? In online Advanced Placement courses?

Questions for Students

a. Preliminary (introduce self, purpose of study, ask permission to tape record)
b. General information
   - Name
   - Contact information (including email address). (Get permission to follow-up in May after completion of AP course and, if applicable, AP exam)
   - Year in high school
   - Gender
   - Ethnic background
   - Estimate of family income
   - Plans for college
c. Online Course Experiences
   - Have you enrolled in or taken any online course?
     - Did you complete the course?
     - If you did not complete the course, why not?
   - I am interested in your experiences taking online classes
     - Would you describe your experience taking a class online?
       - What grade would you give the online class?
       - Do you like going to school online? Why or why not? Is there anything you can think of that would have made the class better for you?
       - What were your experiences with the technical aspects of the course? Did you have equipment you needed?
       - Did you have equipment or other technical problems?
       - Do you feel you had the necessary technical skills to work online?
       - Were expectations for the course or how to work online made clear? Did you feel like you knew what you were getting into?
       - Did you feel like you were ready to take course? Were you given the preparation you needed before taking the course? Who provided the preparation?
       - Did you feel you had the support you needed when taking the course?
       - How would you describe the course workload? More than in a traditional class? Lighter? Heavier?
       - Did you miss face-to-face interactions with the teacher and other students?
       - What did you think of the course content or subject matter? How comfortable were you in working with the content?
       - How was the online instructor? What did you think of the instructor?
       - Did you find it easy to get motivated or difficult?
     - Would you ever take another online course? If not, why not? If yes, what, if anything, would you do differently to help you prepare and succeed in the course?

- Was there anything your school or mentor could have done to help you before or during the course that would have made a difference in your online course experience? What did your school or mentor do to make this a good experience? What could they have done to make a difference in your online course?
  - Did you ever think about dropping out of the online course? Why or why not? If you considered dropping out, did you first talk to a mentor? Did you decide to stick with it after talking to a mentor?
- What factors do you feel helped or hampered you in your experiences in an online class? For example, do you feel like your experiences are different because you are [African/American]?

Online Advanced Placement

Lorenzo, G. "Online Advanced Placement: A New Way to Prepare for College." 2001. <http://www.edpath.com/images/ap%20online.pdf> (27 Sept. 2002).

This article discusses various examples of students who have benefited from participating in online Advanced Placement offered by Florida Online High School (FHS). Most students signing up to take online AP classes live in rural areas or poor urban schools districts that cannot offer classroom versions of the full range of AP courses or any AP courses. FHS online AP courses are developed by experienced, full-time FHS teachers who have taught AP courses in the classroom. The courses are considered rigorous, typically taken over two semesters or 36 weeks. The courses are primarily asynchronous but are supplemented by synchronous elements, such as live chat. The courses are designed to be highly interactive and especially to promote interaction between students and the instructor. Online materials are augmented with CD-ROMs, textbooks, and other materials. Students are required to maintain weekly contact with the instructor and to make regular, steady progress over the period of the course in order to meet course objectives and prepare effectively for the AP exam.

University of California College Prep Initiative. "Spring Status Report." 2002.

A major goal of the University of California College Prep Initiative (UCCP) is to develop high-quality university-owned online AP courses. Online AP courses developed by UCCP are guided by the following pedagogical principles:

- Online courses must offer a learning experience equivalent to a classroom-based course.
- The courses must utilize engaging video and animation content that will capture student interest and stimulate an interactive learning experience.
- The course environment must utilize various communication tools to create a classroom community conducive to cooperative learning.
- Course must provide interactive simulations that allow student participation in laboratory-like activities.
- Courses must foster self-paced individual as well as group-focused activities.
- Student understanding and progress must be continuously assessed, using a variety of tools.

Online Learning Content Design and Pedagogy

Gunawardena, C. "Social Presence Theory and Implications for Interaction and Collaborative Learning in Computer Conferences." *International Journal of Educational Telecommunications* 1, no. 2 (1995): 147.

This paper examines research on social presence theory and the implications for analyzing interaction, communication, collaborative learning, and the social context of computer-mediated communication. While computer-mediated communication is viewed as a medium that is low in social context cues, these studies demonstrate that participants can perceive it as interactive, active, interesting, and stimulating. The kind of interactions that take place between the participants and the sense of community created among them largely determine participants' perceptions regarding the extent to which computer-mediated communication is seen as a "social" medium. The author concludes that the moderators of computer-mediated experiences must create a sense of online community in order to promote interaction and collaborative learning.

Appendix B

Annotated Bibliography

Hanna, Donald E., Michelle Glowacki-Dudka, and Simone Conceicao-Runlee. *147 Practical Tips for Teaching Online Groups*. Madison, WI: Atwood Publishing, 2000.

This book offers a comprehensive set of strategies for teaching online. It begins with pre-instruction preparation, including advice on how to set up and implement an online course and make the course discussions as interactive as those in the traditional face-to-face classroom setting, and then progresses through actual online teaching. The authors attempt to dispel popular myths about online education and anticipate the potential problems instructors face when teaching online.

Horton, Sarah. *Web Teaching Guide: A Practical Approach to Creating Course Web Sites*. Yale University Press, 2000.

This general overview of online learning walks teachers through the practical aspects of designing and teaching an online course. The book covers planning an online learning site and how to create, use, and assess it.

Horton, William. *Designing Web-Based Training: How to Teach Anyone Anything Anywhere Anytime*. John Wiley & Sons, 2000.

This overview on how to design online learning is authored by a leading expert in the field. The book guides readers through the processes of designing, setting up, and managing an online learning site, including assessing student needs, addressing hardware and software issues, and undertaking usability testing.

Johnson, S., S. Aragon, and N. Shaik. "Comparative Analysis of Learner Satisfaction and Learning Outcomes in Online and Face-to-Face Learning Environments." *Journal of Interactive Learning Research* 11, no. 1 (2000): 29-49.

This empirical study compared a graduate online course with an equivalent course taught in a traditional face-to-face format on a variety of outcome measures. Comparisons included student ratings of instructor and course quality; assessment of course interaction, structure, and support; and learning outcome measures, such as course grades and student self-assessment of their ability to perform various instructional systems design (ISD) tasks. Results revealed that the students in the face-to-face course held slightly more positive perceptions about the instructor and overall course quality, although there was no difference between the two course formats in several measures of learning outcomes. The findings have direct implications for the creation, development, and delivery of online instruction.

Jones, B.F., G. Valdez, J. Nowakowski, and C. Rasmussen. "Policy Issues in Using Technology for Engaged Learning." *Plugging In: Choosing and Using Educational Technology*. EdTalk: North Central Regional Educational Laboratory (1995). <http://www.ncrel.org/sdrs/edtalk/policyis.htm> (27 Sept. 2002).

The publication is based on work conducted at the North Central Regional Educational Laboratory (NCREL). It pulls together the latest information on how students learn best and guides educators to those technologies that are most useful in promoting learning. The authors believe that technology used in conjunction with the most recent research and development findings on learning, however, can help all students achieve in school.

"Quality on the Line: Benchmarks for Success in Internet-Based Distance Learning." The Institute for Higher Education Policy. 2000. <http://www.ihep.com/Pubs/PDF/Quality.pdf> (27 July 2002).

A study was undertaken by the National Education Association and Blackboard, Inc., that led to identification of 24 benchmarks considered essential to ensuring excellence in Internet-based distance learning. The benchmarks are divided into seven categories of quality measures currently in use on campuses around the nation. These benchmarks distill the best strategies used by colleges and universities that are actively engaged in online learning, ensuring quality for the students and faculty who use it.

Distance Learning

Saba, F. "Research in Distance Education: A Status Report." *International Review of Research in Open and Distance Learning* 1, no. 1 (2000).

Invariably, since the 1950s, distance learning has been studied by comparing it to classroom instruction. The value of continuing with such research is questionable, given the widespread conclusion of "no significant difference" between distance and classroom formats. Recently, researchers have moved beyond theoretical and experimental comparative studies in favor of new research methods, such as discourse analysis and in-depth interview of learners. According to the author, these new methods address many methodological and theoretical limitations of the physical science view of distance education. Further studies have revealed the complexity of distance education, indicating the many variables involved. Research using methods related to systems dynamics, hierarchy and complexity theories is promising an even more comprehensive way of studying distance learning and its implications.

Western Cooperative for Educational Telecommunications (WCET). "Good Practices in Distance Education." 1997.

This publication was based on a three-year project, the aim of which was to develop standards and principles for educational technology used by higher educational programs. The project concerns were primarily with defining quality and demonstrating the means to identify and encourage it in relation to educational technology and distance learning. These included addressing issues related to faculty competency, appropriate use of technology, access to technology, and student services and support.

Technology Access

"Internet Access in U.S. Public Schools and Classrooms: 1994–2001." National Center for Education Statistics (NCES). 2002. <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2002018> (29 Sept. 2002).

This comprehensive report presents key findings from the survey "Internet Access in U.S. Public Schools, Fall 2001." This survey was conducted by NCES using the Fast Response Survey System (FRSS), designed to administer short, focused, issue-oriented surveys that require minimal burden on respondents and have a quick turnaround from data collection to reporting. Questionnaires for this survey were mailed to a representative sample of 1,209 public schools in the 50 states and the District of Columbia. The findings cover school connectivity; students and computer access; operating systems, memory capacity, and disk space; special hardware and software for students with disabilities; the Internet as a way to communicate with

parents and students; and technologies and procedures to prevent student access to inappropriate material on the Internet.

Phipps, R. "Access to Postsecondary Education: What is the Role of Technology?" National Postsecondary Education Cooperative. 2000. <http://nces.ed.gov/npec/papers/PDF/WhatRoleTechnology.pdf> (27 Sept. 2002).

This report analyzes how the advent of technology in colleges and universities, together with other emerging postsecondary education providers has helped or hindered the ability of certain classes of people – such as racial/ethnic and low-income groups – from enjoying the benefits of education beyond high school.

Virtual Schools

California Virtual School Report: A National Survey of Virtual Education Practice and Policy with Recommendations for the State of California. University of California College Preparatory Initiative (UCCP). 2002. <http://www.edpath.com/images/VHSReport.pdf> (28 Sept. 2002).

This study was authored by Knowledge Base, and the Clovis Unified School District on behalf of the University of California College Preparatory Initiative (UCCP). The study examines virtual high schools across the country, the state of virtual learning in California, and the state of technologies supporting virtual education in order to explore the possibilities for a statewide online learning program. One of the goals of such a program would be to serve the needs of students who do not have full access to a college preparatory curriculum. Information obtained from extensive focus groups revealed the need, among others, for "high-quality, interactive course content and a specialized, collaborative course repository, some level of local control of an online program; and strong mechanisms for student support and teacher training."

Clark, T. "Virtual Schools: Trends and Issues. Distance Learning Resource Network." A WestEd Project, 2001.

This is a report of broad-based study that undertook a comprehensive analysis of virtual school activities and trends across the U.S. Based on July-August 2001 online survey of state-approved or regionally accredited schools and a peer group survey of 44 virtual schools, the author estimated that between 40,000 and 50,000 K-12 students would enroll in online courses in 2001-2002. The author concluded that the trend favoring virtual secondary schools will continue and Calculus AB was the online AP course offered by most schools. The tuition for virtual schools varied greatly, with most schools reporting a tuition of $300/semester. The author noted that at least 14 states have plans for launching a state-sanctioned, state-level virtual school or already had a school in place. Other categories of virtual schools include university-based virtual schools, virtual school consortia, virtual schools operated by individual schools or districts, virtual charter schools, and private virtual schools. The study also examined for-profit providers of curricula, content, development tools, and infrastructures. The author also offers recommendations for planners considering establishing virtual schools.

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